

Indiana University – Purdue University Fort Wayne
Opus: Research & Creativity at IPFW

Computer and Electrical Engineering Technology &
Information Systems and Technology Senior Design
Projects

School of Engineering, Technology and Computer
Science Design Projects

4-30-1979

A Stereo Graphic Equalizer

Steven D. Retter

Indiana University - Purdue University Fort Wayne

Follow this and additional works at: http://opus.ipfw.edu/etcs_seniorproj



Part of the [Computer Sciences Commons](#), and the [Engineering Commons](#)

Opus Citation

Steven D. Retter (1979). A Stereo Graphic Equalizer.
http://opus.ipfw.edu/etcs_seniorproj/260

This Senior Design Project is brought to you for free and open access by the School of Engineering, Technology and Computer Science Design Projects at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in Computer and Electrical Engineering Technology & Information Systems and Technology Senior Design Projects by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact admin@lib.ipfw.edu.

**A Stereo Graphic
Equalizer**

by Steven D. Retter

**Submitted to the Faculty of
Electrical Engineering Technology
April 30, 1979**

Purdue University

Fort Wayne, Indiana

CONTENTS

	<u>Page</u>
Summary -----	1
Introduction-----	2
Frequency Response -----	3
Standard Tone Controls -----	5
The Octave Band Equalizer -----	6
Equalizing for Listening Room Acoustics -----	8
General Design Considerations -----	11
The Input Buffer -----	15
Series Resonant Circuits -----	19
The Equalizer Amplifier -----	25
Equalize/Defeat Selection -----	28
The Muting Circuit -----	28
The Power Supply -----	30
Test Results -----	31
Conclusions and Recommendations -----	37
Bibliography -----	40

TABLES AND FIGURES

Table	Page
1 Specifications -----	37
Figure	
1 Sound Pressure Level vs Frequency -----	4
2 Amplifier Response vs Frequency -----	7
3 Equalizer Output vs Frequency -----	9
4 General Block Diagram -----	13
5 Octave Band Equalizer Schematic -----	14
6 Modified Equalizer Block Diagram -----	16

Figure	<u>Page</u>
7A Modified Input Buffer -----	18
7B Loss Relative to Cutoff Frequency -----	18
8A Gyrator Circuit -----	21
8B Simulated Inductor -----	21
8C Equivalent Circuit -----	21
9 Modified Series Resonant Circuit -----	24
10 Equalizer Amplifier -----	26
11 Muting Circuit 1 -----	29
12A Left Channel Equalizer Schematic -----	32
12B Right Channel Equalizer Schematic -----	33
12C Power Supply/Muting Control Schematic -----	34
13 Actual Response (Controls Flat) -----	35
14 Actual Response (Controls Alternately Boosted) --	36
15 Actual Response (1KHZ Control) -----	38

Summary

1

Frequency response is an audio system characteristic that plays an important role in determining the quality of the sound. Poor room acoustics can degrade the overall frequency response of even the most expensive audio systems. Though sometimes standard bass and treble controls help compensate for frequency irregularities caused by room acoustics, they do not offer enough flexibility for every acoustic situation. An octave band equalizer is a highly versatile tone control unit that offers the listener control over 10 octaves of the audio frequency spectrum. Therefore, an equalizer is superior to standard tone controls for tapering the frequency response of an audio system. Most equalizer designs consist of three basic building blocks, an input buffer, resonant circuitry or bandpass filters having adjustable gain, and a summing amplifier. For this project, portions of an existing equalizer design were redesigned and some new features were added. Test results of this unit revealed the numerous tone variations that can be achieved.